

Teacher Notes – KEY

CRS	FUN 502 Express sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
Objective	<ul style="list-style-type: none"> 10.1 Identify and define sine, cosine, tangent ratios using SOHCAHTOA 10.2 Write a ratio for sine, cosine, and tangent when side lengths are variables or number values <ul style="list-style-type: none"> given a figure given a word problem given one of the side length ratios

Trigonometry

“trigon” - a triangle

“metry” - process of measuring

Hypotenuse Hyp. → longest leg	Adjacent Leg Adj. → leg touching θ	Opposite Leg Opp. → leg furthest away from θ
Sine $\frac{opp}{hyp}$ abbreviation: Sin	Cosine $\frac{adj}{hyp}$ abbreviation: Cos	Tangent $\frac{opp}{adj}$ abbreviation: Tan

Adjacent and Opposite Legs

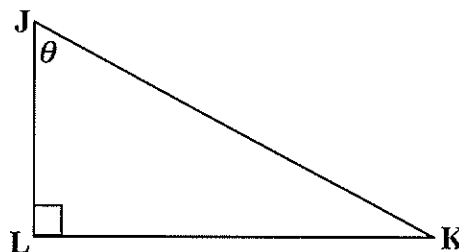
Triangle JLK is a right triangle. $\angle J = \theta$

θ = a Greek symbol usually representing an angle measure

Opposite Leg to θ : \overline{LK}

Adjacent Leg to θ : \overline{JL}

Hypotenuse: \overline{JK}

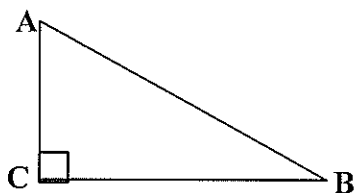


Example 1: Identify the opposite and adjacent legs to $\angle B$.

Opposite Leg: \overline{AC}

Adjacent Leg: \overline{CB}

Hypotenuse: \overline{AB}

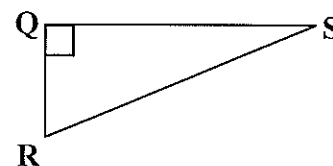


Example 2: Identify the opposite and adjacent legs to $\angle R$.

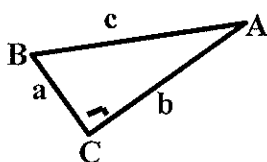
Opposite Leg: \overline{QS}

Adjacent Leg: \overline{QR}

Hypotenuse: \overline{RS}



SOHCAHTOA



Sine (sin) sine of $\angle A = \frac{opp}{hyp}$ $\sin A = \frac{a}{b}$	Cosine (cos) cosine of $\angle A = \frac{adj}{hyp}$ $\cos A = \frac{b}{c}$	Tangent (tan) tangent of $\angle A = \frac{opp}{adj}$ $\tan A = \frac{a}{b}$
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S O H

C A H

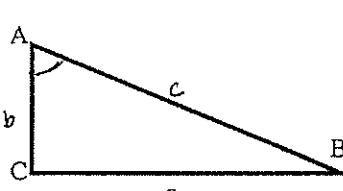
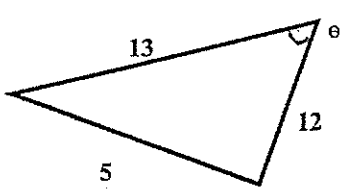
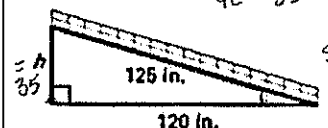
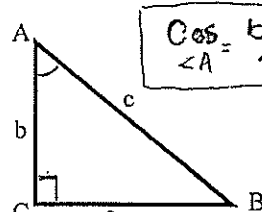
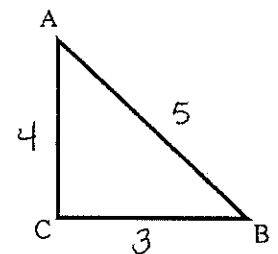
T O A

PUSH IT TO THE LIMIT.

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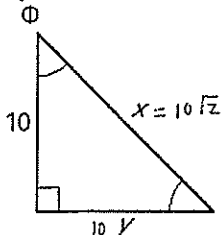
CW#57: Undefined Rational & Radical Expressions
Honors Geometry

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<p>1) Find each trigonometric ratio for the given right triangle.</p> <p> $\sin A = \frac{a}{c}$ $\cos A = \frac{b}{c}$ $\tan A = \frac{a}{b}$ </p> 	<p>2) Find each trigonometric ratio for the given right triangle.</p> <p> $\sin \theta = \frac{5}{13}$ $\cos \theta = \frac{12}{13}$ $\tan \theta = \frac{5}{12}$ </p> 
<p>3) An angle in a right triangle has a measure θ. If $\tan \theta = \frac{8}{15}$, then $\sin \theta = ?$</p> <p> $\tan \theta = \frac{8}{15} \leftarrow \frac{\text{opp}}{\text{adj}}$ $\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{8}{17}$ $8^2 + 15^2 = (\text{hyp})^2$ $64 + 225 = (\text{hyp})^2$ $(\text{hyp}) = 17$ </p>	<p>4) A shipping dock has a mobile ramp that is used to help load and unload cargo from trucks. The ramp is 125 inches long and has a base that is 120 inches long. What is the <u>sine</u>, <u>cosine</u>, and <u>tangent</u> of the angle made with the ramp and the ground?</p> <p> $a = 35 \leftarrow (\text{Pythag thm})$ $\sin = \frac{35}{125} = \frac{7}{25}$ $\cos = \frac{120}{125} = \frac{24}{25}$ $\tan = \frac{35}{120} = \frac{7}{24}$ </p> 
<p>5) In the figure below, $\angle C$ is a right angle, and a, b, and c represent the lengths of the sides of the right triangle. What is the cosine of $\angle A$?</p> <p> $\cos \angle A = \frac{b}{c}$ </p> 	<p>6) In the figure below, $\triangle ABC$ is a right triangle with a right angle at C. Which of the statements about this figure is <u>NOT</u> correct?</p> <p> $\sin A = \frac{3}{5}$ a. $\cos A = \frac{4}{5}$ b. $\tan A = \frac{2}{4}$ c. $\cos B = \frac{4}{5}$ d. $\tan B = \frac{1}{2}$ </p> 

PUSH IT TO THE LIMIT.

7) List out the sine, cosine, and tangent of angles Θ (pronounced *theta*) and Φ (called *phi*).



$$\sin \Theta = \frac{10}{10\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos \Theta = \frac{10}{10\sqrt{2}} = \frac{\sqrt{2}}{2}$$

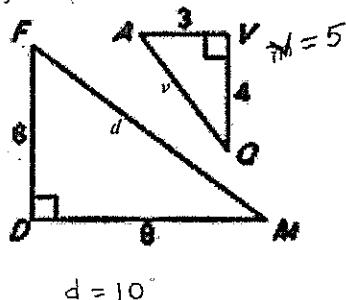
$$\tan \Theta = \frac{10}{10} = 1$$

$$\sin \Phi = \frac{10}{10\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos \Phi = \frac{10}{10\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\tan \Phi = \frac{10}{10} = 1$$

8)



a. What is the sine of M?

$$\sin M = \frac{6}{10} = \frac{3}{5}$$

b. What is the cosine of F?

$$\cos F = \frac{6}{10} = \frac{3}{5}$$

c. What is the sine of A?

$$\sin A = \frac{4}{5}$$

d. What is the cosine of Q?

$$\cos Q = \frac{4}{5}$$

e. What is the sine of Q?

$$\sin Q = \frac{3}{5}$$

f. What is the cosine of A?

$$\cos A = \frac{3}{5}$$

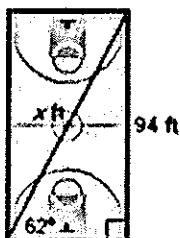
g. What is the tangent of Q?

$$\tan Q = \frac{3}{4}$$

h. What is the tangent of A?

$$\tan A = \frac{4}{3}$$

9) You walk from one corner of a basketball court to the opposite corner. Write and solve a proportion using a trigonometric ratio to approximate the distance of the walk.

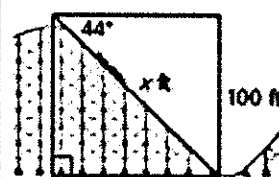


$$\sin(62) = \frac{94}{x}$$

$$x = \frac{94}{\sin(62)}$$

$$x \approx 106.5$$

10) You are at the top of a roller coaster 100 feet above the ground. The angle of depression is 44° . About how far do you ride down the hill?

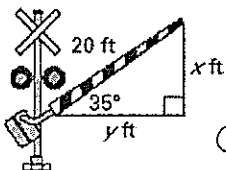


$$\sin(44) = \frac{100}{x}$$

$$x = \frac{100}{\sin(44)}$$

$$x \approx 144$$

11) A railroad crossing arm that is 20 feet long is stuck with an angle of elevation of 35° . Find the lengths x and y .



$$\sin(35) = \frac{x}{20}$$

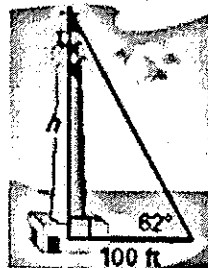
$$20 \sin(35) = x$$

$$x \approx 11.5$$

$$\cos(35) = \frac{y}{20}$$

$$20 \cos(35) = y \approx 16.4$$

12) Find the height h of the lighthouse to the nearest foot.



$$\left(\frac{h}{100}\right) = \tan(62)$$

$$h = \tan(62) 100$$

$$h = 188.0 \text{ ft}$$

PUSH IT TO THE LIMIT.